

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. §112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 73-82 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically:

a. **Claims 73 and 80-82** recite the following limitations that are vague,

indefinite, and confusing (as mapped to claim 73):

- "representing each mounting point in three dimensional space... with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement" (claim 73, lines 11-14) – It is unclear as to whether the "Z-axis component" (the "Z-number") is a third spatial dimension in an X/Y/Z coordinate system where each dimension is associated with a distance, is a location in two-dimensional space in an X/Y coordinate system where the Z-number extends along the X-axis, or is a component loading order (not associated with space at all). The original specification defines a Z-number as "unique number to recognize the position in the X-axis direction where each parts cassette... is loaded" (original specification, 21:16-18). If the "Z-number" is a component loading order, then the "Z-number" is not a spatial dimension, but is merely a dimension. Please clarify exactly what a Z-number is with more precise claim language.
- "wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts" (claim 73, lines 15-16) – It is unclear as to how the "circuit boards" can be "arranged along the Z-axis" if the Z-axis is not a spatial dimension but is merely a component mounting order. It is possible that the arrangement of the circuit boards can correspond to the mounting order of the component supply parts in a non-spatial third dimension, but it is unclear how the circuit boards can be arranged

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along the Z-axis if it is not a spatial dimension. Please be more precise with the claim language.

- "the mounting points" (claim 73, lines 17-18 and 20) – It is unclear as to which mounting points the applicant is referring to because this term lacks antecedent basis. Specifically, it is unclear as to whether "the mounting points" are all the mounting points of the components mounted onto "a corresponding circuit board of a plurality of circuit boards" (claim 73, lines 7-8), or all the mounting points of the components that are held in the "plurality of component supply parts" (claim 73, lines 3-4). The applicant in the preamble referenced "a corresponding mounting point" (claim 73, line 7), this "mounting point" being located on "a corresponding circuit board of a plurality of circuit boards" (claim 73, lines 7-8). However, in the body of the claim, the applicant specifies "the mounting points" in the plural. Please be more precise with which "mounting points" the term refers to in the claim language.
- "a length of a first component mounting path" and "a length of a second component mounting path" (claim 73, lines 17-19) – Similarly, it is unclear as to which mounting points comprise each "component mounting path." Specifically, the applicant does not specify whether the mounting points for each mounting path are confined to mounting points associated with one circuit board, a group of circuit boards, a component supply part, or a plurality of component supply parts. Please be more precise with the claim language.

Claim Rejections - 35 USC § 102

The following is a set of quotations of the appropriate paragraphs of 35 U.S.C.

§102 that form the basis for the rejections under this section made in this Office Action:

- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
- (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only

if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 73-75 and 80-82, as best understood, are rejected under 35 U.S.C. § 102(b) as being anticipated by *Maenishi et al* (US Patent 6,289,582).

- a. *Maenishi et al* discloses the following in his reference:
 - i. representing each mounting point in a three dimensional space (Figs. 1-5), with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board (Figs. 1-5), and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part in a loading arrangement of the component supply parts (Figs. 1-5; specifically, Fig. 4), wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts (3:33-39; 4:54-67; Figs 1-5; *each circuit board is consecutively brought onto the X-Y table and aligned with a Z number (cartridge) containing known components*);
 - ii. comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement (7:53-67; Figs. 1-5), with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths (7:53-67; Figs. 1-5);
 - iii. determining an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the short component mounting path so as to determine an optimized component mounting order (7:53-67; Figs. 1-5);
 - iv. after said determining of the optimized loading arrangement, rearranging the loading arrangement of the component supply parts (8:1-39; Figs. 1-5);

- v. comparing a length of the optimized component mounting path with a length of a component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in the rearranged loading arrangement, so as to determine a shortest component mounting path (8:31-39; Figs. 1-5);
 - vi. determining a further-optimized component mounting path by selecting the determined shortest mounting path (8:31-39; Figs. 1-5);
 - vii. said determining of the optimized loading arrangement is carried out by temporarily arranging the component supply parts (7:53-67; Figs. 1-5; *original arrangement*) and correcting the temporary arrangement (8:1-39; Figs. 1-5) so as to thereafter determine the optimized component mounting path;
 - viii. changing a location of a second component supply part (8:31-39); and
 - ix. obtaining the distance while the second component supply part is sequentially changed and arranging the second component supply part which corresponds to a shortest obtained distance at a position adjacent to the first component supply part (8:1-39).
- b. In addition, the examiner notes that claims 80-81 are considered to be product-by-process claims. The patentability of the product does not depend on its method of production. Determination of patentability is based on the product itself. See MPEP 2113. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

In the alternative, **Claims 73-75 and 80-82**, as best understood, are rejected under 35 U.S.C. § 102(e) as being anticipated by *Kuribayashi et al* (US Patent 7,020,956).

- a. Kuribayashi et al discloses the following in his reference:
- i. representing each mounting point in a three dimensional space (Figs. 4, 8A-B, and 12), with an X-axis component and a Y-axis component corresponding to a location on a surface of the corresponding circuit board, and with a Z-axis component being a Z-number corresponding to a location of a corresponding component supply part (Figs. 4-10 and 12, items 116a-b) in a loading arrangement of the component supply parts (Figs. 4, 8A-B, and 12), wherein the circuit boards are arranged along the Z-axis in accordance with Z-numbers of the component supply parts (1:45-50; Figs. 3-5C and 8A-11; *each circuit board is consecutively brought onto the X-Y table and aligned with a Z number (cartridge) containing known components*);
 - ii. comparing (1) a length of a first component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in an initial loading arrangement (14:20-51; Figs. 1-10), with (2) a length of a second component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in a modified loading arrangement, so as to determine a shorter of the first and second component mounting paths (14:20-51; Figs. 1-10);
 - iii. determining an optimized loading arrangement of the component supply parts and a component mounting order on the circuit boards by adopting the loading arrangement corresponding to the short component mounting path so as to determine an optimized component mounting order (14:20-51; Figs. 1-4, 5A-B, 6-7, 8A-B, 9A-B, and 11-12; *the examiner notes that the illustrations show components from the component supply parts being delivered; the examiner further notes that any movement in any direction of a component supply part or the components within the component supply parts constitutes an "arrangement" or "rearrangement" of the component supply part.*);
 - iv. after said determining of the optimized loading arrangement, rearranging the loading arrangement of the component supply parts (14:20-51; Figs. 1-10; *the examiner notes that the illustrations show components from the component supply parts being delivered; the*

examiner further notes that any movement in any direction of a component supply part or the components within the component supply parts constitutes an "arrangement" or "rearrangement" of the component supply part);

- v. comparing a length of the optimized component mounting path with a length of a component mounting path connecting the mounting points arranged in the three dimensional space based on the component supply parts being in the rearranged loading arrangement, so as to determine a shortest component mounting path (14:20-51; Figs. 1-10);
 - vi. determining a further-optimized component mounting path by selecting the determined shortest mounting path (14:20-51; Figs. 1-10);
 - vii. said determining of the optimized loading arrangement is carried out by temporarily arranging the component supply parts (14:20-51; Figs. 1-10; *original arrangement*) and correcting the temporary arrangement (14:20-51; Figs. 1-10) so as to thereafter determine the optimized component mounting path;
 - viii. changing a location of a second component supply part (*moving cassettes inherent*); and
 - ix. obtaining the distance while the second component supply part is sequentially changed and arranging the second component supply part which corresponds to a shortest obtained distance at a position adjacent to the first component supply part (14:20-51).
- b. In addition, the examiner notes that claims 80-81 are considered to be product-by-process claims. The patentability of the product does not depend on its method of production. Determination of patentability is based on the product itself. See MPEP 2113. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

Claim Rejections – 35 USC § 103

The following is a quotation of 35 U.S.C. § 103(a) that forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically taught or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. § 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 76-79, as best understood, is rejected under 35 U.S.C. § 103(a) as being unpatentable over *Maenishi et al* (US Patent 6,289,582) or *Kuribayashi et al* (US Patent 7,020,956) in view of *Minerath III et al* (US Patent 7,066,006).

- a. In addition to the limitations in claim 75, *Maenish et al* or *Kuribayashi et al* does not expressly disclose obtaining a product of variances of each of X and Y coordinate values and Z-numbers of the mounting points of the circuit boards while Z-numbers are changed and then obtaining a loading arrangement of the component supply parts which reduces the variances product.
 - i. However, *Minerath III et al* teaches obtaining a product of variances of an arrangement of data points by measuring variances for spatial values showing locations of the data points (10:43-56). The

advantage of optimizing an arrangement of data points by obtaining the variances is to statistically analyze the arrangement of spatial data. Thus, it would have been obvious to obtain a product of variances of each of X and Y coordinate values and Z-numbers of the mounting points of the circuit boards while Z-numbers are changed and then obtain a loading arrangement of the component supply parts which reduces the variances product to statistically analyze the arrangement of spatial data.

- b. In addition to the limitations in claim 76, *Maenish et al* or *Kuribayashi et al* as modified does not expressly disclose obtaining a first variance product for a first loading arrangement of the component supply parts, obtaining a second variance product for a second loading arrangement of the component supply parts, comparing the first and second variance products to determine a smaller of the compared variance products, setting the smaller of the compared variance products as the first variance product, and repeating this process so as to determine a substantially reduced variance product.
 - i. However, the examiner takes Official Notice of computational methods designed to determine the lowest value in a group of values. The advantage of obtaining the variance products of two groups, comparing the variance products of the two groups to determine the smallest variance product, setting the smaller of the compared variance products as the first variance product, and repeating this process with a third group is to find the smallest variance product. Therefore, it would have been obvious to obtain the variance products of two groups, compare the variance products of the two groups to determine the smallest variance product, set the smaller of the compared variance products as the first variance product, and repeat this process with a third group to find the smallest variance product.

Response to Arguments

Applicant's arguments filed 8/11/08 have been fully considered but they are not persuasive.

First, the applicant argues that *Maenishi et al* does not disclose "representing each mounting point... in a modified loading arrangement" (claim 1, lines 11-21). However, the examiner disagrees. See argument above. Specifically, *Maenishi et al* uses three dimensional space to represent an X, Y, and Z axis dimension (Figs. 1-5). *Maenishi et al* further compares "a length of a first component mounting path connecting the mounting points... based on the component supply parts being in an initial loading arrangement" (7:53-67; 8:26-31; *calculating the cycle time for each individual component within a group of components and the total time for processing each group of components*), with "a length of a second component mounting path connecting the mounting points... based on the component supply parts being in a modified loading arrangement" (7:53-67; 8:26-31; *components are regrouped based upon the cycle time of each component and the total time for processing each group of components*).

Further, applicant argues that *Maenishi et al* "discloses arraying the components on the feed tape based on a distance between mounting points on the surface of a single mounting board..." (applicant's argument, page 14, lines 5-6). However, even if the applicant is correct, the claims as written are not distinguished from *Maenishi et al*. It is noted that the feature upon which applicant relies (i.e., the number of mounting points considered in "a length of a... component mounting path" – a single mounting board or some other quantity) is not clearly recited in the rejected claims. Although the

claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In addition, for the same reasons as noted above, *Maenishi et al* discloses an apparatus that performs the functions listed above.

Second, the applicant argues that *Kuribayashi et al* does not disclose "representing each mounting point... in a modified loading arrangement" (claim 1, lines 11-21). However, the examiner disagrees. See argument above. In addition, for the same reasons as noted above, *Kuribayashi et al* discloses an apparatus that performs the functions listed above.

The examiner notes that some basic terms must be clarified in claims 73 and 80-82. These terms include the coordinate system, Z-axis (Z-number), relationship between the "circuit boards" and the Z-axis, and "the mounting points" (which mounting points comprise a component mounting path).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David P. Angwin whose telephone number is 571-270-3735. The examiner can normally be reached on 7:30 AM - 5 PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant, can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. Dexter Tugbang/
Primary Examiner
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DPA